METHOD 3 - GAS ANALYSIS FOR THE DETERMINATION OF DRY MOLECULAR WEIGHT

Applicability and Principle

This method is applicable for the determination of CO_2 and O_2 concentrations and dry molecular weight of a sample from an effluent gas stream of a fossil-fuel combustion process or other process. The sample is taken in a flexible bag and analyzed with an orsat analyzer or alternatively, with analyzers using the procedures from Method 3A.

A gas sample is extracted from a stack by either single point integrated or multi-point integrated sampling. The gas sample is analyzed for percent CO_2, O_2, and if necessary CO.

Apparatus

Pump. A leak free diaphragm-type pump, or it's equivalent, to transport the sample to the flexible bag.

Rate Meter. A rotameter, or equvalent, capable of measuring flow rate to within 2 percent of the selected flow rate will be used. A flow rate of 500 to 1000 cc/min. will be used unless another rate is required and described in the "Proposed Deviations" section of this template.

Flexible Bag. Any leak free plastic (Tedlar, Teflon, Mylar, etc.) bag or equivalent having a capacity consistent with the selected flow rate and sample time **leak checked** in accordance with Section 2.2.6 of the method. Type of Bag _____

Pressure Gauge. A water filled U-tube manometer, or equivalent, of about 30 cm (12 in.) for the bag leak check.

Vacuum Gauge. A mercury manometer, or equivalent, of at least 760 mm (30 in.) Hg, for sampling train leak check.

Procedure (*select one*)

_____ **Single Point Integrated**. The sampling point will be at the centroid of the cross section of the duct. The bag will be leak checked as in Section 2.2.6 of the Method. The train will be leak checked as in Section 4.2 of the Method. The sampling system will be purged prior to connecting the sample bag. The sample will be taken at a constant rate simultaneous with, and for the same total length of time as, each pollutant emission rate determination. At least 30 liters of sample will be taken.

_____ **Multi-Point Integrated Sampling**. The minimum number and location of the traverse points will be chosen in accordance with EPA Method 1. The procedures outlined in Sections 4.2 through 4.5 of Method 3 will be followed, except that the sample will be taken while traversing the stack from each sample point for an equal length of time.

Emission Measurement Test Procedure

Within 8 hours of collection, the sample will be analyzed for percent CO_2 and percent O_2 using an orsat analyzer. The orsat analyzer will be leak checked in accordance with Section 6 of the Method prior to any sample analysis. The analysis and calculations for each sample will be repeated until any three analysis differ from their mean by no more than 0.3 g/g-mole (0.3 lb/lb-mole). The three molecular weights will be averaged and reported to the nearest 0.1 lb/lb-mole.

Several compounds may interfere with the orsat analysis (ie. acid gases, unsaturated hydrocarbons, nitrous oxide and ammonia). Source specific compounds that may interfere with the orsat analysis are: _____.

Action to be taken:

Date the orsat analyzer was checked against known O_2 and CO_2 standards _____

Alternatively, if direct analysis of the bag samples will be performed by EPA Method 3A procedures, it will be indicated here and the procedures will be included in the protocol. _____

Calculations

The calculations will be performed in accordance with Section 7 of the method.

Proposed Deviations from this BTS template or the Method

(Insert any proposed deviations here)